Introduction

Customer choice of electricity suppler is rapidly becoming common place. In 1998 millions of retail customers in six or more states will, for the first time, choose their own suppliers of electricity. It is anticipated that competitive markets and customer choice will outdo traditional regulatory oversight in lowering costs, allocating risks and choosing new, and clean resources. For this to happen, electricity customers—like customers in any competitive market—must be well informed. Lessons from other markets and early experience from pilot retail competition projects have shown that giving customers reliable information — preferably in a standardized format — is critical. Reflecting this, the National Association of Regulatory Utility Commissioners (NARUC) recently passed a resolution calling for the uniform disclosure standards including price, price variability, resource mix and the environmental characteristics of electricity purchases.[1] The resolution concludes:

> *The National Association of Regulatory Utility Commissioners (NARUC), ... believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and*
>
> *NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and*
>
> *NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.*

The full resolution can be found in Appendix A.

The limited retail choice pilot programs to date have featured a wide array of environmental claims by marketers (see table 1). Power marketers often stress the environmental advantages of their product for one reason—many customers prefer environmentally benign power sources. Publicly available independent customer surveys (and presumably the marketers' own research) show that many customers prefer clean power sources and sometimes are willing to spend more to get them. As a result, environmental claims for electricity products may become a fixture of the competitive landscape.

A uniform disclosure mechanism would give customers an accurate, objective basis for comparing the environmental (and other) claims of competitive suppliers. Otherwise, without the common language of uniform disclosure, customers must continue to sift through the vague, unverifiable, and often misleading claims that have been common in the pilot program. Customer focus groups conducted with pilot program participants in New Hampshire and Massachusetts confirm consumer dissatisfaction with the "apples to oranges" comparisons they have been asked to make.

Table 1

An environmental disclosure policy is desirable for many reasons. Besides giving customers an objective basis by which to compare products, it protects suppliers from unfair trade practices claims by setting clear rules. It protects against customer backlash aimed at environmentally benign resources by helping to ensure that customers get what they pay for. Depending upon the level of customer demand, it can result in cleaner resources and less pollution.

Disclosure

What is special about electricity?

Why require uniform disclosure of electricity instead of relying on marketing by sellers and existing federal and state advertising laws to inform consumers? There are several answers. Uniform, consumer-friendly labeling or disclosure is required in many sectors of the economy. Food, appliance and automobile labels and standard disclosure for consumer loans are the most well known. In each case, the history (or likelihood) of customer confusion demonstrates societal interest in uniform disclosure.

Consumer protection requires full disclosure of key attributes of competitive electricity sales for several reasons. Shopping for electricity is a new experience for consumers. The intangible nature of the commodity and the inability to distinguish one kilowatt-hour (kWh) from another will make it nearly impossible for individuals to independently determine the source of the power or to verify whether claims are true. Experience with the pilot programs shows a high level of consumer confusion. Complex price structures make it difficult even to compare the price of competing offers.

In addition to providing environmental information, uniform labels should include a common measure of price that combines customer charges, demand charges, complex time-of-use charges and sign-up bonuses into a representative average price for the typical residential consumer. Because this part of a label does not require any form of tracking (even if it does require clear standards for calculation), it is not discussed further in this report.

Giving consumers environmental information about their electricity is important from a societal perspective, as well. The scale of the industry's environmental effects is far-reaching, ranging from very small effects for most renewables and new, gas-fired technologies to much larger effects for older, coal-fired facilities. If electricity restructuring is to give retail customers an opportunity to make meaningful choices regarding the source or environmental nature of their electricity purchases, customers will need reliable and consistently developed information based on some sort of tracking and verification system. Likewise, to abide by state and federal truth in advertising laws, generators or marketers of electricity will need a tracking and reporting system to substantiate any environmental claims.

The challenge is to develop a workable system of environmental disclosure so that customers can make informed choices. To be workable, disclosure should provide a common standard that facilitates comparisons between suppliers in a way that balances simplicity and accuracy.

Environmental claims

It is clear from early experience with retail competition pilot programs that environmental or green marketing may be a primary tool to attract customers.[2] Retail competition pilot programs are now under way, and the promotional literature is useful to provide a sense of the types of claims that companies will make. Many competitors are making environmental claims presumably because they believe environmental considerations are an important factor to customers who are shopping for electricity.

A list of environmental claims made by competitors in the New Hampshire and Massachusetts pilot programs, sorted by type of claim, is provided in table 1.

This paper deals primarily with the first group of claims—those directly related to power supply, some of which can be misleading. For example, the claim that a particular supplier has no coal, nuclear or Hydro Quebec in its mix is dubious and undocumented. The implied claim that pumped storage hydro is 100 percent hydropower is probably false, given that pumped storage facilities require energy from other power plants for pumping.[3]

What to disclose?

The most fundamental questions are what to disclose generally and what to disclose in the form of a simple label. Ongoing research and decisions by regulators have begun to identify a long list of information that will be required to be disclosed to consumers.[4] This may include consumer rights, complaint process and disconnection and payment policies. With effort, a standard one-or-two page document might be prepared to help consumers understand and compare key terms.

Our focus, however, is on a uniform label which, like food labels, conveys key but very limited information. Our experience suggests that a useful label (table 2) might convey information about price, resource mix and certain environmental characteristics. This is supported by recent regulatory decisions in Vermont, Massachusetts and Maine and the recent NARUC resolution.

Table 2

Of course, the choice of the exact content and format of such a label is difficult and sensitive. For example, there is a wide range of air emissions levels from coal fired plants. In principle, customers could be informed of the specific emissions from "their" plants by several methods; for example, by reporting "clean" and "dirty" coal separately or by disclosing emission levels so customers would directly determine the effects of specific coal purchases. This issue of label content and format is addressed in a companion report in this series titled *Information Disclosure for Electricity Sales: Consumer Preferences from Focus Groups*.

Tracking Transactions

Is it possible to know where electricity at a customer's meter came from? This simple question has a complex answer because electricity follows the laws of physics, not the computations of accountants. With an interconnected grid, the power flow over the transmission system is ambiguous. A relevant generalization is that power is put into the grid at certain points and taken out at other points. Which generator produced the power that went through a particular customer's meter is, in a physical sense, indeterminate, except in a very few cases.

The fact that electrons cannot be traced back from a customer to a source has not impaired the ability of power producers and power suppliers to plan their systems, choose what to build and what to buy, inform consumers and others of the supplier's fuel mix or emissions or, most important, transact hundreds of billions of dollars of business. For market purposes, it is sufficient to know which firms were selling into the grid, which were buying from it and where losses were occurring.

Long before "restructuring" entered the lexicon, to assure a smoothly functioning market, utilities developed mechanisms and settlement processes to track who generates, who consumes and who buys. While the details vary from place to place, all share a common basic design. For each buyer, the electrical energy taken from the system must be matched by an amount equal to the buyer's purchases, plus losses incurred in delivering such amounts to the buyer's system by the sellers. This is the basis for the cash payments.

In looking at the cash flow for wholesale purchases and sales, energy flow data is essentially irrelevant. Buyers pay for kWhs received from the system at a particular-place; sellers are paid for kWhs delivered to the system. Except for questions of system reliability, and sometimes transmission pricing — the cash flow is more important than the energy flow. Cash flows dictate financial risks and rewards of power plant investment, expansion, operation and retirement decisions, and these are the decisions that result in more or less environmental harm. Attachment B provides an example of tracing cash flows through the system.

NEPOOL example

The basic structure of the tracking system is the same in markets based on power pools, on bilateral contracts or on any blend of the two. In markets limited to bilateral contracts, tracking is conceptually straightforward, since every transaction has an identified buyer and seller. Tracking for a power pool is not difficult either however, The New England Power Pool (NEPOOL) provides a good example because it consists of a complex web of buyers, sellers, generation, and contract types. It also is a good example because it functions like a competitive retail market in which financial contracts, including contracts for differences, operate independently from actual power plant operations or power flows.

Currently, NEPOOL centrally dispatches all power plants in a six-state region to minimize the total operating cost of meeting demand. Least-cost dispatch occurs without regard to plant ownership or contracts. Except for special cases, internal purchases or sales of plant owner-

ship, contracts for plant output or contracts for system power do not affect which plant actually operates. Contract and plant ownership affect cash flows and, as discussed earlier, these cash flows ultimately dictate expansion and retirement decisions.

Despite the complexity and large number of participants and contracts, all the cash flows in New England are based on the metering described in detail in Appendix B. The rights and obligations of each participant are written and clearly understood. This allows buyers, sellers and generators to conduct daily operations with confidence that generators will be paid, although at any particular hour, they may not know which buyer will pay the bill. The NEPOOL settlements or billing process clears monthly, as bank accounts and consumer credit card statements. This monthly accounting process is, in essence, the disclosure tracking process.

NEPOOL is an especially interesting example because the hundreds of contracts between participants take many forms (unit, system, interruptible). Yet, because the system is centrally dispatched, all the contracts are essentially financial. This has not impaired the ability of each participant to report its own fuel mix to EIA and display it prominently in annual corporate reports.[5]

POOLCOs and bilateral structures

New competitive structures and new terminology do not affect the underlying need for, or the basic methods of, tracking cash flow. For example, in a pure POOLCO model, aggregator A could have a power supply contract with supplier 1. Assume the contract does not constrain supplier 1's operations in any way so supplier 1 will be free to meet aggregator A's supply requirements as supplier 1 sees fit. This means supplier 1 will operate only during hours that pool prices are greater than supplier 1's operating costs. Supplier 1's obligation to meet aggregator A's load during other hours will be met with purchases from the pool.

The settlements process would trace cash based on the basic informational building blocks described earlier: aggregator A's metered demand, supplier 1's metered generation and the contract between aggregator A and supplier 1. POOLCO will know aggregator A's demand and supplier 1's level of operation each hour. POOLCO also will know the key terms of the contract between aggregator A and supplier 1. (This is particularly true if pool rules require sellers to meet reserve requirements by owning or contracting for minimum amounts of capacity.)

The tracking system for disclosure would work much like the tracking system for cash flow. Aggregator A is buying power with supplier 1's characteristics to the extent supplier 1 is running. The remainder of aggregator A's needs are met with power from the pool. The pool's characteristics are the averages of all power received that POOLCO has not matched to a seller.

> Example: Aggregator A buys 10 megawatts (MW) from a wind generator and 20 MW from a gas-fired plant. In hour one, aggregator A has 15 MW of retail load; the wind plant is producing 5 MW and the gas plant is producing 10 MW. In hour one, aggregator A's mix is 33 percent wind and 66 percent gas. In hour two, aggregator A's load grows to 20 MW and the plant operations are unchanged. In hour two, aggregator A's

mix is 25 percent wind, 50 percent coal, and 25 percent spot purchases from the pool. (The pool purchases will be the weighted average of that hour's sales to the pool). Aggregator A's fuel mix for the year will be the weighted, average fuel mix for 8,760 hours.

Suppose the market structure was bilateral with an ISO or some other settlement agent and no pool. The basic building blocks are the same: metered customer load, metered generation and contracts. Assuming the same actors as our POOLCO example, aggregator A buys from supplier 1. Supplier 1 will operate or will make separate bilateral contracts with other sellers to match supplier 1's demand. The ISO will have hourly information on supplier 1's output and on aggregator A's load. The ISO also will have basic information on aggregator A's contract with supplier 1. The information is needed because supplier 1 (including any of supplier 1's bilateral support contracts) may be higher or lower than aggregator A's demand. To deal with this, supplier 1 will buy an ancillary, balancing service from the ISO. The ISO needs the contract information to know who to charge for the balancing services.

The example can be made more complex if aggregator A buys from suppliers 1, 2 and 3, and aggregator A sells green electricity to some consumers and regular electricity to others. In this case aggregator A's purchases are metered, as are the deliveries from suppliers 1, 2 and 3. Aggregator A's total fuel mix is determined by the relative deliveries from suppliers 1, 2 and 3, and the nature of the contracts. The only limitation on aggregator A's selling two products is that the weighted average mix of aggregator A's green and regular sales must match aggregator A's total mix. (See the data availability section 4.1 for a discussion of sellers that offer more than one product.)

Market structures, including any of the examples above, also might adopt simplifying conventions. For example, as described above, the POOL or spot market in a region would compute and disclose the average POOL characteristics. All sellers could be given the option of using the POOL average in their own disclosures. As was the case above, the POOL average would reflect the average characteristics of all resources not specifically committed to a buyer.

In a fully competitive retail market, the information to be traced will increase significantly as the number of sellers, buyers and transactions increases. Nevertheless, the basic building blocks of metered load, metered generation and contract administration remain the same. The details of the future settlement processes will vary, depending on the market structure adopted. Some market structures will have pools and some will not. The one constant is that all market systems and related settlements will be based on metered loads, metered output and contracts.

Aggregators A, B and C will be joined by D through Z. Those joining may be generators, marketers and brokers. Each will need to know its load, just as aggregators A, B and C did. Metering may be different for different sellers, but each seller will be subject to a clearly written agreement outlining how its load will be tracked. A combination of real-time meters and simpler metering with agreed-upon load profiles will be required for each supplier.[6]

Competitive markets might also include a variety of financial contracts (as distinguished from power sales contracts) that operate outside the power market and have no direct bearing on the settlements process or disclosure. For example, beyond aggregator A's power sales contract with Supplier 1, aggregator A could sign an insurance policy (or contract for differences) with financial institution Y that reduces supplier 1's price volatility. Neither supplier 1 nor any ISO or POOLCO would need to be aware of this side contract. Supplier 1 also might have a financial contract—a futures contract for example, to protect against supplier 1's risk of meeting aggregator A's load at agreed upon prices. Again, neither A nor any POOLCO or ISO would need to know about the futures contract, and if these contracts were purely financial, they would not be reflected in the disclosed fuel mix.

Data

Data availability issues

The data needs for a disclosure system raise two issues. First, will disclosure require the collection of data that is not presently collected? Here the answer is a simple no. For practical purposes all data needed to implement resource mix and environmental labeling already is collected.[7]

Second, is the data publicly available? Here the answer is more complex. In all but a few instances the data is publicly reported somewhere. A detailed description of sources of available data is presented in Appendix D. The problems are:

- All information is not available on a timely basis, and it is scattered among different federal and state agencies. Data is measured and reported to the EPA, FERC, EIA or the relevant state environmental agency.
- Some entities including some Independent Power Producers (IPPs), cogenerators and power marketers either do not report all the needed data or the data is aggregated in a way that is not useful for disclosure purposes.
- There is a growing trend for all types of market participants to request that reported data be kept confidential.

These issues are discussed below, but our review of the issues and data suggests that an effective disclosure system can rely on current definitions and the raw data already collected. However, although no new measurements are anticipated, speedier availability of useable data is critical. To simplify the collection and reconciliation of existing data bases, the best option is to coordinate with market institutions (power exchanges and ISOs) that are starting to specify the computer software to be used in the tracking process. Software should be designed to handle resource mix and environmental information, along with all other data needed for the safe and efficient operation of the new system.

Must information disclosed be historic or might it be prospective? The simpler approach is to base disclosure on actual performance during a recent historical period. The example used in this report assumes disclosure is based on periodically updated historical data.[8] The possibility of tracking and reporting prospective fuel use has not been explored.

Timing

The time required for data to be publicly available can be considerable. The FERC Form No. 1 data, for instance, is filed in the spring for the previous calendar year. The bulk power database, a very useful compilation of information on power transactions from various forms, is currently available roughly a year after the end of the data year. In January 1997, the 1995 EIA-767 data (generation and estimated air emissions by plant) was not yet available. The quality checks conducted by the EPA for continuous emissions monitoring data can take six to nine months. An August 1996 EIA report discusses the data compiled from EIA Forms 860 and 861 (on generators and utilities, respectively) and states that "Data for 1993 are available at no charge on the FedWorld electronic bulletin board."[9] This lag time of more than two

years is probably too long for reasonable use in an environmental disclosure system for electricity customers.

State environmental agencies issue air emission licenses for virtually all stationary sources. These licenses generally require, that quarterly filings be made within weeks of the close of each quarter. Emission, fuel use and generation (or a close approximation) information is publicly available from these filings, but no national or regional collection system exits to simplify collation of the information.

The time lag for environmental data is short enough to rely on publicly available sources. The same is not true for generation data. This suggests relying on ISO's or similar entities for generation information and matching generation sources with emission data reported to public entities.

Coverage and aggregation

The aggregation of transactions currently is only a problem in only a very limited number of cases. The bulk power database includes detailed transaction reporting in an unambiguous way. The reporting requirements for power marketers include prices and quantities of electricity bought and sold. However, the quarterly reports of power marketers appear to lump together some transactions even when they occur in different regions. For example, the report for a transaction between Coastal Electric Services Company and Electric Clearinghouse in the fourth quarter of 1995 lists a single quantity of electricity transacted at three delivery points: Mid Columbia, Palo Verde and PJM.[10] A disclosure system will need information on a disaggregated basis, at least differentiated by region.

Nonutility generators also are significant participants in the nation's electricity supply. Disaggregated data (on generation, fuel use and emissions) for these sources is publicly available only from state environmental agencies.

A disclosure system that is based on publicly available data will require more information from nonutility sources than now is available. Reliance on ISO or settlements systems to track this information is an alternative.

Data confidentiality issues

Market participants, emphasizing the changing nature of the industry, are increasingly requesting that various data not be provided or, alternatively, be provided under a protective agreement.[11] A recent and very alarming study surveyed state utility commissions and found that requests for trade secret protection for a wide variety of types of data are being routinely granted.[12]

Three facts provide some comfort that widespread and broad-based granting of confidential treatment will not continue. First, most, if not all, of the requests and commission approvals have occurred before commissions began to focus on the need for consumer information to allow competitive markets to operate efficiently. Second, most requests were unopposed,

and it appears they were approved on the basis of administrative ease rather than as a result of serious examination of trade secret law.

Finally, the essential data for a disclosure system includes historical generation by unit, the emissions and fuel use associated with generating resources and the buyer, seller and quantity of energy for each transaction. The preliminary conclusion of an upcoming report in this series entitled "*Full Consumer Disclosure: Confidentiality vs. Public Right to Know*" is that the type of information needed for environmental and other consumer disclosure would not be protected by trade secret laws.

The ISO role in disclosure

In many regions of the country, new entities are being created (or existing entities are being modified) to support evolving electric power markets. The types of entities include regional transmission groups, power exchanges and independent system operators (ISO). The details and the roles of the various entities currently are being negotiated and will surely differ by region. In all cases, some entity—or combination of entities—will be responsible for the settlement process to ensure that all generation is accounted for and billed accordingly. For ease of presentation, we will refer to the entity with this responsibility as the ISO.

Masiello and Willis (1996) summarize the software development requirements for implementation of ISO functions, concluding that "the ISO's task will be an order of magnitude greater than that faced by existing utility control center operators" and will need new software integrating the capability to "track several thousand transactions daily" with "advanced power systems analysis technologies" to ensure economical and secure operation of the system.

The ISO software for tracking power transactions could be required to keep track of the original generating source and identify the environmental attributes of electricity at the point of retail sale. This should be built into the institutional mission of the ISO and built into ISO's computational capabilities. During the next few years, ISOs will obtain hardware and software to carry out their system operation mandate. The technical specifications for the software should allow for environmental tracking—even as the details of how the tracking system will work are developed. Retrofitting the environmental tracking system into the software could be much more expensive.

Other Disclosure Issues

Disclosure by products or by company?

A fundamental question is whether reporting should be of a single company-wide average or whether it may be done for particular products within a company. Should product disclosure allow a large company with a number of polluting power plants to develop and offer a separate green product? For example, under a product approach a supplier with a small wind project and 99 percent of its generation from coal could offer two products. One, amounting to 1 percent of its output, would be the full output of the wind project with a disclosure statement showing 100 percent renewable sources and zero emissions. The other would be all coal, with emissions disclosure based the coal plant's performance. With supplier (or company) disclosure, on the other hand, all the firm's sales would carry a single disclosure label based on the combined operation of the wind and coal plants. Under this approach, all subsidiaries or divisions of the same corporate parent would carry the same disclosure label. In pilot programs in New Hampshire and Massachusetts, four suppliers provided this type of company disclosure, which also is termed "generation profile."

Our review of tracking systems shows that it is possible to report either by supplier or by product, although the likelihood that there will be far fewer suppliers than products makes the data requirements simpler for the supplier approach.[13] The examples used in this report nevertheless assume use of the more complex product approach.[14]

The main advantage of product disclosure is that it provides a meaningful incentive for a large, existing company to develop and offer a green project. For example, a large existing company with little or no renewables now would have little incentive to invest in a new renewable technologies under a supplier approach because the renewable source would be too small to have any significant effect on the overall company disclosure statement.

The main policy disadvantage to product disclosure is that it could result in simply allocating clean resources to those customers who preferred it without any real change to the electricity supply system. For example, if the existing amount of renewable electricity is sufficient to "satisfy the demand" of customers who want renewable electricity, then disclosure will not encourage the addition of new renewables.[15]

Full vs. optional disclosure

Should disclosure be required of all sellers or only of those that choose to make environmental claims or otherwise voluntarily disclose? There are many policy arguments on both sides, most of which were argued at length during debates over food, car mileage, appliance labels and disclosure statements for loans and securities. Mandatory disclosure combines consumer desire to be able to compare all supply options with the public policy interest in an informed public.

Arguments in favor of optional disclosure include:
- Lower costs
- Parallels Federal Trade Commission practice of policing environmental claims
- Allows market to develop before full disclosure rules are established

Arguments in favor of full disclosure include:
- Public interest in consumer choice being informed by fuel mix and emission information
- Consumer research showing strong desire for the information
- Reduced consumer confusion

These issues and more will be discussed in future reports. The discussion in this section is limited to issues related to tracking.

Some who object to mandatory disclosure argue that it is impossible to track the required information and that disclosure should be limited to those who choose to make environmental claims. Thus, Working Assets—a company that buys power from NEES and sells power that includes "no nuclear, coal, or Hydro Quebec"—or Northfield Energy—a subsidiary of NU that sells "100 percent hydro" might have to disclose fuel mix and environmental characteristics to verify their claims, but others would not. We have three responses to this approach. First, the FTC and state consumer protection laws require that environmental claims be verifiable and substantiated no matter whether disclosure is mandatory or optional.[16] A tracking system will be needed if environmental claims of the type we have seen thus far are to be made by any sellers. To disclose fuel mix and environmental characteristics on a voluntary basis requires the adoption of the same credible, verifiable tracking system that would be needed to support disclosure for all sellers.

Second, voluntary disclosure invites gaming; assuming a product approach is used and companies are allowed to sell their green supplies to some customers and their less environmentally-preferred supplies to others, two important considerations arise. Unlike other green products, the nature of electricity is such that if a supplier sells the green part of its mix to some customers, the remainder of its mix automatically becomes browner. Thus, supplier 1 may have a system that consists of green and not-so-green supplies. If supplier 1 heavily markets its green supplies and shows fuel mix accordingly, then sells the remainder of its supply with no disclosure whatever, consumers may either believe that all of supplier 1's products are green or be unaware that supplier 1's green resources are no longer part of supplier 1's mix. To protect consumers and to reveal to them the status of supplier 1's sales of green power, disclosure of all products may be necessary.

An important and related third issue is the need to assure consumers that the same power is not being sold more than once. For example, if supplier A has 100 kW of "green" power, it should not be able to sell its green power to five different 100 kW customers. Likewise, as wholesale sales of "system power" to other suppliers, B should not include any of the same green power already sold at retail. To make sure this is the case, the tracking system would need to account for all sales in a way that can reconcile the sum of the parts, or products, with the whole.

Disclosure of wholesale transitions

Since retail disclosure requires knowing the environmental and fuel profiles of all the retail supplier's sources, a retail seller needs to know the mix of its wholesale suppliers. The best solution is simply to require all suppliers, wholesale and retail, to disclose their mix.

Communicating information to customers

What should the labels look like and where should they appear? The final answer to both questions must await completion of consumer research, but some lessons can be gleaned from the rich history of food labeling. For example, the format for disclosure should be standardized and designed to allow customers to make easy comparisons between competing suppliers. The information should be conveyed in terms that most consumers understand (e.g. percentages rather than micrograms), and the information should be provided for only the most important characteristics. Disclosure statements could be made available to customers at key decision points.

Where and how often should consumers receive the information? Customers need the information when they are faced with a buying decision. At a minimum, this means labels should appear in marketing materials and any other solicitations. Disclosure at the time of requesting service from a supplier is a necessary first step. Because consumers are likely to receive solicitations to switch suppliers and because fuel mix and emission information changes, customers also should receive periodic—perhaps quarterly—reminders and updates.

The administrative cost burden on the suppliers also is an issue. How often should disclosure figures be recalculated? Fuel mix and emissions levels change constantly. As a practical matter, annual data updated quarterly probably is frequent enough.

Treatment of energy efficiency and offsets

The retail pilot programs show that environmental claims and marketing approaches often include energy efficiency and emissions offsets though other actions that are not directly related to generating plants. For example, a firm might offer to plant enough trees to offset carbon dioxide emissions of their power plants. Should the disclosure labels simply reflect the emissions from generation or should the effects of energy efficiency and offsets be netted out?

This report focuses on a disclosure and labeling system that ties retail electricity sales to generation, reporting physical attributes of that generation mix. It may be possible to include these offset options in labels, but the focus is first on electricity sales. Clearly, firms should be at liberty to market and report energy efficiency, retirement of sulfur dioxide emission credits, procurement of carbon dioxide offsets and other "environmental currency." At this point, it is assumed that a disclosure label will first show generation fuel mix and resulting emissions and then, perhaps, show offsets separately.

Enforcement

Enforcement of disclosure requirements does not need to involve a large regulatory commitment. In the first instance, electricity suppliers should be responsible for determining and reporting their disclosure information, much as food suppliers are responsible for the "Nutritional Facts" labels affixed to most food items. There may be a role for a government or independent entity, such as the ISO, to monitor and spot check the information. In most, if not all, cases this could be done using information that already is being reported to various government agencies such as FERC, EPA and EIA. The issues and options for enforcement will be discussed more fully in future reports.

Conclusion

Can we trace electrons or kWh from source to delivery? No.

Can we trace cash flow? Yes. In fact, if we cannot trace dollars, we cannot have a competitive electricity market.

Can established cash tracing methods be used to give consumers meaningful information about and control over the environmental consequences of their purchase decisions? Yes. When customers chose a particular supplier, they are, in essence, deciding which firm they will pay for their electricity. In making that decision, they are deciding how much and what type of resources the firm will need to own or purchase to provide that service. The link between the purchase decision and environmental consequences is clear, and information is available to allow customers to make meaningful distinctions between suppliers.

Is it practical to give consumers information? Yes. Giving consumers fuel mix and emission information is clearly practical if the information is aggregated and averaged over months or a year. Depending on the precise form of future pools, ISOs and settlement processes information, it may be practical to provide the information on a more timely basis.

Finally, what are the most important next steps? There are at least three:

- State commissions, particularly those considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional work groups to identify local implementation options and issues. Input should be gathered from a broad cross section of stakeholders.
- Federal and state commissions should carefully assess and take into account in their discussions the extent to which the public interest in full disclosure outweighs requests for trade secret status.
- Federal and state commissions should recognize that the formative stage of new market institutions, such as an ISO, is the best time to examine how operations can efficiently improve consumer access to key information.

Appendix A. NARUC Resolution

RESOLUTION IN SUPPORT OF CUSTOMER "RIGHT-TO-KNOW" AND PRODUCT LABELING STANDARDS FOR RETAIL MARKETING OF ELECTRICITY

WHEREAS, at least 30 million consumers in six states will begin choosing among competitive electricity providers in early 1998 and retail access to competing electricity suppliers is under consideration in many other states; and

WHEREAS, electricity purchases make up a significant portion of the budget of many households;

WHEREAS, the production of electricity imposes very substantial environmental impacts; and

WHEREAS, pilot retail access programs have shown that customer confusion and misleading claims are highly likely; and

WHEREAS, clear and uniform disclosure will promote efficiency through informed product comparisons; and informed customer choice cannot occur in a retail electricity market without full disclosure of all relevant and important facts; and

WHEREAS, the desirability and feasibility of such disclosure is clearly established in nutrition labeling, uniform food pricing, truth-in-lending and many other federal consumer protection programs; and

WHEREAS, the National Association of Regulatory Utility Commissioners (NARUC) at its November, 1994 meeting adopted a resolution on competition and stranded benefits calling for new proposals to preserve environmental and diversity benefits in a more competitive marketplace; and

WHEREAS, The NARUC at its July, 1996 meeting adopted principles to guide the restructuring of the electric utility industry which included market-based mechanisms to promote effective consumer choice and to preserve renewable resources, resource diversity, and environmental protection; now therefore be it

RESOLVED, that The National Association of Regulatory Utility Commissioners (NARUC), convened at its 108th Annual Convention in San Francisco, California believes that the electric industry should facilitate informed customer choice that will promote efficient markets, resource diversity, and environmental quality; and be it further

RESOLVED that the NARUC supports initiatives leading to minimum, enforceable, uniform standards for the form and content of disclosure and labeling that would allow retail and wholesale consumers easily to compare price, price variability, resource mix, and environmental characteristics of their electricity purchases; and be it further

RESOLVED that the NARUC urges states adopting retail direct access programs to include enforceable standards of disclosure and labeling that would allow retail consumers easily to compare the price, price variability, resource mix, and environmental characteristics of their electricity purchases.

Appendix B. Tracing cash flow: an example

A tracking system for emissions and resource mix would work by following the cash flow. We assume that the electricity a vendor sells—and therefore that the consumer "uses"—is the electricity for which she pays.

For any period, there is a known amount of electricity generated and a known amount of electricity consumed. After accounting for losses and storage, these must be equal. Ultimately, the retail buyers compensate the generators, in some cases through one or more intermediaries. By following the contracts and the flow of money from retail consumers to generators, one can develop a reasonable idea of accountability.

Because of the large number of power plants, the volume and diversity of transactions and the huge cash flow, tracking money for settlement purposes is and has always been a formidable task. The metering and data requirements are substantial. Nevertheless, it is a task being done everywhere in the country, and one that will continue, perhaps with even greater urgency, after restructuring. Money is tracked in the wholesale market using the following information:

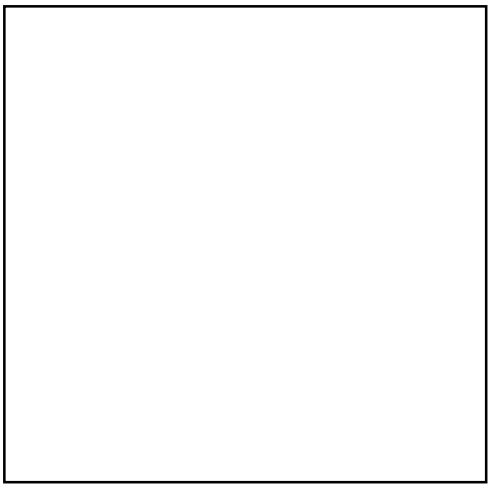
- *Metered output of generators*. All generators delivering power to the utility grid, regardless of location or ownership, are metered in considerable detail (hourly kWh recordings at a minimum).
- *Metered load of buyers*. In today's environment wholesale buyers are mostly monopoly utilities. Utility load generally is metered at the substation where power is delivered to the distribution system. In the future there will be many different types of buyers. Although metering approaches will vary, all buyers will be metered in some fashion.
- *Metered interconnections*. All interconnections between utility systems are metered. The net flow into a service territory plus "local" generation (generation located within the service area no matter who owns it) provides a measure of the load plus losses within the service territory.
- *Supply rights*. Ownership rights and contractual agreements determine who has the rights to specific power sources. These will determine what sources, wherever they may be, are used to meet the load requirements in a service area.

Nationwide, billions of dollars change hands based on this data.

The following example illustrates the tracing of money. Figure 1 shows three utilities that operate in a state or region with internal and external ties. For a particular hour, Utility A has a total load of 600 MW metered at all of its substations. This represents the aggregate load of all retail consumers within A's territory. Ignoring losses in the distribution system, summing the metered load of each individual retail consumer would equal the same 600 MW (assuming every consumer had real-time meters).

On a physical basis, A's 600 MW load is being met by 500 MW of local generation (generation physically in A's service territory, regardless of who has the output rights) plus 100 MW of net interchange with its interstate and intrastate interconnections.

Appendix B. Tracing cash flow (continued)



The second half of tracing money and the associated supply characteristics requires knowing A's supply rights (owned generation and contracts) and balancing the cash flow associated with A's load and supply.

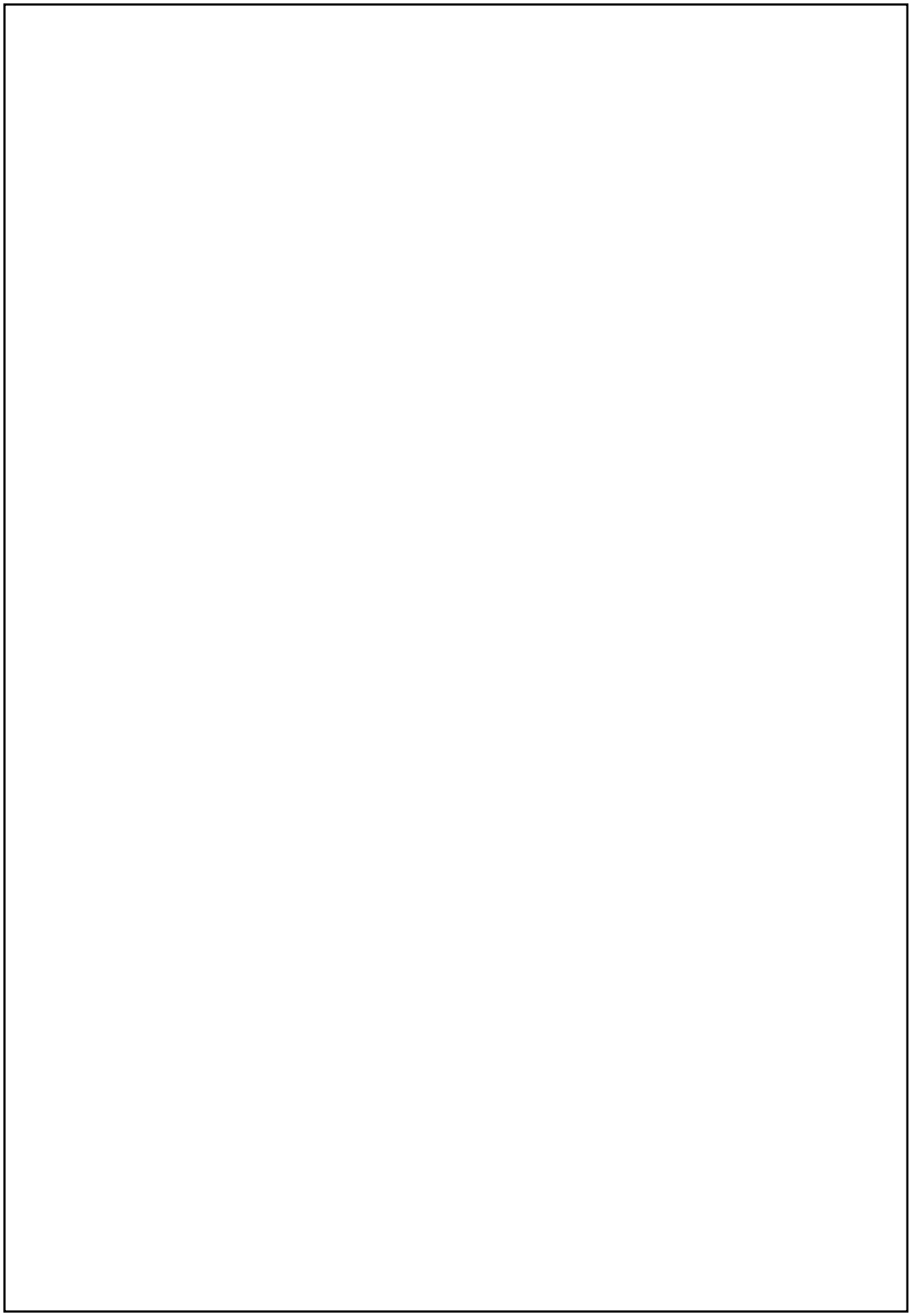
In this example A, B and C are meeting their customers' needs through a mix of their own power plants and contracts from suppliers within and outside the region. As the electric utility industry changes, A, B and C may be utilities, marketers, brokers, aggregators or deregulated generators of one type or another. Whatever their makeup, each will have an hourly demand measured or estimated at the point of retail sale. Each seller will meet its hourly demand through some combination of its own power plants and contracts for supplies from others, possibly including purchases from a spot market.

Tables B-1 and B-2 provide the needed information to track through our example. Table B-1 provides an overview of the supply rights for A, B, and C. The first column begins with the major power flows shown in figure 1. The second column shows the supply rights. Thus, the 500 MW of local generation in A's territory, 400 MW are owned by A and 100 are owned by B.

Imports and exports from metered interconnections are more complicated. A has 500 MW of incoming power flow and 400 MW of outgoing flow giving a net import of 100 MW.[17] The second column of Table B-1 shows the supply rights associated with the imports and exports. The third column of Table B-1 shows how each part of A's supply rights could be reflected in a disclosure statement.

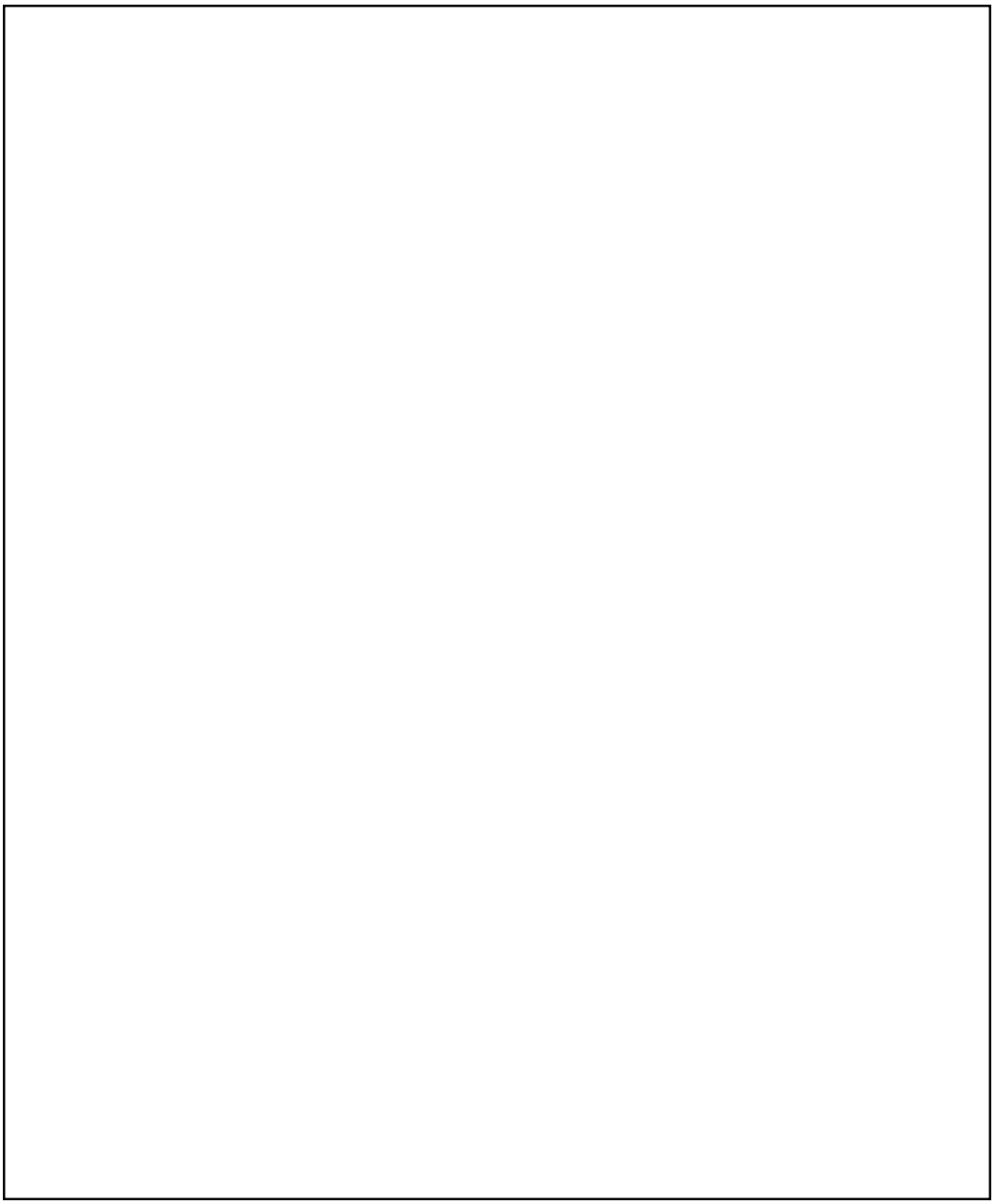
Table B-1

Appendix B. Tracing cash flow (continued)



Appendix B. Tracing cash flow (continued)

Table B-2 shows to the next level of detail, and for each supply (owned or contract) shows the type of contract, the fuel type and the emission characteristics for two pollutants. With respect to fuel mix and emissions, this example shows that the source of the data depends on the type of contract. For unit contracts, the supply characteristics are those of the plants or plants involved. For system contracts, the average supply characteristics of the supplying entity can be a reasonable power from a spot electricity market.



Appendix C. Equations for Attributing Emissions and Fuel Mix to Retail Sales

Balancing Equations:

Producer total generation

$$_{Gp} = S_g P_{p,g}$$

Producer sales; internal and wholesale

$$I_{p=r} = _{Gp} - S_{r(\neq p)} W_{p,r}$$

Retailer sales; from internal and wholesale sources

$$S_r = (1-L_{r,r}) I_{p=r} + S_{p(\neq r)} (1-L_{p,r}) W_{p,r}$$

Environmental Equations:

Producer emission factors

$$PE_{p,e} = (S_g E_{p,e,g} P_{p,g}) / _{Gp}$$

Retailer emission factors

$$RE_{r,e} = (PE_{r,e} I_{p=r} + S_{p(\neq r)} PE_{p,e} W_{p,r}) / S_r$$

Producer fuel mix

$$PF_{p,f} = (S_g F_{p,f,g} P_{p,g}) / _{Gp}$$

Retailer fuel Mix

$$RF_{r,f} = (PF_{r,f} I_{p=r} + S_{p(\neq r)} PF_{p,f} W_{p,r}) / S_r$$

Variables:

$E_{p,e,g}$	Emission factor of type e for generating facility g of producer p
$F_{p,f,g}$	Fuel fraction of type f for generating facility g of producer p
$_{Gp}$	Total generation for producer p
$I_{p=r}$	Internal company sales
$L_{p,r}$	Loss factor associated with transfers from p to r
$P_{p,g}$	Production from generating facility g of producer p
$PE_{p,e}$	Producer average emission factor
$RE_{r,e}$	Retailer average emission factor
$PF_{p,f}$	Producer average fuel mix factor
$RF_{r,f}$	Retailer average fuel mix factor
S_r	Retailer r sales
$W_{p,r}$	Wholesale sales from producer p to retailer r

Subscripts:

e	Environmental impact category (e.g. SOx, NOx, CO2. ¼)
f	Fuel type (e.g. Coal, Oil, Gas, Hydro, Nuclear, ¼)
g	Generating facility
p	Producer
r	Retailer (p=r means same company)

Appendix D. Available Data

Environmental Data

Data on air emissions from power plants is measured by utilities using continuous emissions monitoring systems (CEMS). This data is collected by the EPA and entered into the EPA's emission tracking system (ETS). The coverage of power plants is good. A "complete" database should be available for 1996, omitting only units less than 25 MW and some cogenerators and independent power producers. The EPA conducts quality control checks, summarizes the information and makes it available on the Internet. The EPA has developed specific technical rules for continuous emissions monitoring including the treatment of missing data, record keeping, quality assurance and reporting (40 CFR Parts 9, 72, and 75, *Federal Register*, Volume 60, No. 95, May 17, 1995). The data include emissions of SO_2, NO_x and CO_2, as well as the heat input of the fuel used. Sources of information on emissions data include EPA reports.[18]

There is also a voluntary program for reporting greenhouse gas emissions. While 12 of the 15 highest emitting utilities reported their CO_2 emissions for 1995, the overall coverage of this program is poor, with reported utility CO_2 emissions at only 43 percent of estimated national total electric utility CO_2 emissions (EIA, July 1996).

A great deal of environmental information is available at the state level. Any facility, utility or nonutility that requires an air emission license reports all major emissions and fuel input. The data generally is reported quarterly, within a few weeks of the close of a quarter.

Generation and Fuel Use Data

The EIA collects and publishes data about on electric power plants in the United States, specifying the owner, capacity, fuel type and other parameters. Form EIA-860, collected on an annual basis from 900 electric utilities, is summarized and made available in print[19] or electronic form (http://www.eia.doe.gov). Information specifically on renewable generation is published by the EIA in its *Renewable Energy Annual Report*[20] (EIA, December 1995) and in the Renewable Electric Project Information System (REPIS) developed by the National Renewable Energy Laboratory (described in Appendix DISCO of EIA, December 1995). A key limitation of these sources appears to be that they focus upon capacity and do not provide figures for energy generation.

The EIA also collects a great deal of information on fuel use for power generation, most notably the Uranium Industry Annual Survey (Form EIA-858), the Monthly Report of Cost and Quality of Fuels for Electric Plants (Form FERC-423), EIA Form -860 The Annual Electric Generator Report, EIA-759 *The Monthly Power Plant Report*, and the *Annual Report of Major Electric Utilities, Licensees, and Others* (Form FERC-1). A private company summarizes key data from the FERC-1 and offers the information for sale on disk.[21]

A useful summary of data for steam generators in the United States is the EIA-767. This is collected annually from 893 respondents and includes information about generators, includ

Appendix D. Available Data (continued)

ing owner, generation by unit, fuel use by type and boiler, boiler efficiency, in-service year, emissions control equipment and air emissions. This data is available on disk from the EIA.

Data on generation from plants that are not owned by electric utilities is collected from 1,400 nonutility power producers on Form EIA-867. This data includes capacity, fuel use and generation. It is made available only in highly aggregated form (e.g., on a state-level) and so is not very useful for an environmental disclosure system.

Data also is available at the state level. Any generator that requires an air emission license reports fuel input data from which generation can be estimated. In addition, if IPPs or QFs sell to regulated utilities, monthly generation and payments may be available in reports to PUCs.

Electricity Transaction Data

Data about wholesale electricity transactions is collected on seven different forms:

- FERC Form 1—Annual Report of Major Electric Utilities, Licensees and Others
- FERC Form 1-FERC—Annual Report of Nonmajor Public Utilities and Licensees
- Form EIA-412—Annual Report of Public Electric Utilities
- Form EIA-861—Annual Electric Utility Report
- Form FE-781R—Annual Report of International Electrical Export/Import Data
- REA Form 7—Financial and Statistical Reports (Electric Distribution Borrowers)
- REA Form 12—Financial and Statistical Reports (Electric Power Supply Borrowers and Electric Distribution Borrowers with Generating Facilities)

The EIA summarizes this information and publishes it in printed form (Electric Trade in the United States 1992, EIA September 1994). Even better, the electronic version of this data is available on-line and with standard EIA codes for companies that make it possible to link the transaction database with other EIA data (e.g., Form EIA-860).

The wholesale electric trade data, also sometimes referred to as the bulk power trade data, is comprehensive, even redundant, in its coverage. For most transactions, it has information reported by both the buyer and the seller, providing an opportunity to check for consistency. Transactions are identified as exchanges, purchased power, sales for resale or wheeling. The main limitation to the usefulness of the trade data is that it takes the EIA a year or more to pull together the database.

Another potentially useful source of information on power transactions is the FERC Form No. 714, the Annual Electric Control and Planning Area Report. This includes identification of generating plants in the control area, monthly aggregate outages, monthly loads and transactions, hourly loads and marginal costs. The hourly information is provided in electronic form. The high level of aggregation (control areas such as PJM, NYPP and NEPOOL are made up of many companies) makes this data unsuitable as a basic source of information for disclo-

Appendix D. Available Data (continued)

sure. The control area data may, however, be useful as a supplementary source, perhaps for assigning attributes to imported power from a neighboring control area that is not functioning under the same disclosure protocols.

Finally, power marketers, whose numbers are increasing rapidly, file their transaction information in quarterly power marketer reports to FERC. It seems likely that, over time, the information filing requirements for power marketers and for utilities will converge. A standardized requirement for monthly or quarterly reporting probably would work better for environmental disclosure than annual reporting.

Notes

1. Disclosure is factual and objective. For example a particular purchase might be 40 percent coal, 30 percent gas and 30 percent geothermal power. It does not address subjective claims, such as whether a particular purchase is good or bad, clean or dirty.

2. In addition to the pilot programs, a number of "green pricing" programs are under way, before to the introduction of retail choice of supplier. For example, Wisconsin Electric's "Energy for Tomorrow Renewable Energy Program" offers customers an opportunity to "purchase electricity generated by renewable resources" with an option allowing 25 percent, 50 percent or 100 percent of "the electricity used in your home will be displaced by renewable energy." Many of the same disclosure issues apply to either case (green marketing in a retail choice context or green pricing in a monopoly context), but the problems are somewhat more complex in a market environment due to the increased number of suppliers and aggregators, the new types of transactions (spot market, futures, etc.) and the wider array of green offerings.

3. The New Hampshire ad from Northfield Energy was one of this year's winners of the Center for Science in the Public Interest's Harlan Page Hubbard Lemon Award for deceptive advertising.

4. Alexander 1996.

5. Annual reports to shareholders often include color graphs showing utility fuel mix and historic changes. Resource diversity and particular types of supply mix are touted as reasons investors should be happy with the company. For example, after graphically displaying 1980 and 1990 fuel mix, Central Maine Power Company's (CMP) annual report to shareholders says:

"CMP's new resource additions are a great help in continuing our long-standing policy of diversifying our energy mix, tapping renewable and indigenous resources, promoting cost effective conservation, and reducing our dependence on oil. ... The oil-fired portion of CMP's net generation dropped to 16 percent in 1990, the lowest level since the early 1950s. CMP's progress, which will continue, offers economic and environmental benefits for the State of Maine at large, as well as for our customers and investors."

6. The use of load profiles raises issues about which entity takes the risk for errors in these profiles. These issues are beyond the scope of this paper.

7. In some cases, data used for disclosure purposes will be precisely measured or metered data and, in other cases, it may include estimates such as emission factors applied to fuel input and average heat rates. In either case, the necessary degree of accuracy—probably plus or minus 10 percent—will likely be achieved.

8. While this might be adequate in most cases, there will be circumstances where a supplier's resource mix changes dramatically, for example due to the construction of new resources

and/or the retirement of existing plants. Simple hybrid approaches can be designed to address this. A firm could base its disclosure on a prior year's actual data, but could, as an option, use its own projections. However, if the actual results were much worse than its projections, it might be required to notify consumers or be subject to a penalty of some kind.

9. Page 27, EIA, August 1996.

10. January 30, 1996 letter from Michael A. Woytowich of Coastal Electric Services to Lois D. Cashell, Secretary, FERC.

11. Some agencies, most importantly the FERC, have been more reluctant to approve requests for confidential treatment. The FERC considered and rejected utility arguments that current information filing requirements (including the generation and transaction data necessary for a disclosure system) are unfair and should be cut back for utilities. The FERC decided that it

> "will not adopt the suggestion made by a number of commenters that we now eliminate the public disclosure of allegedly competitively sensitive, proprietary, or otherwise confidential data submitted to the Commission on Form No. 1, as well as on other Commission forms. The information that we collect for public utilities is necessary to carry out our jurisdictional responsibilities of cost-based rates subject to our jurisdiction and the operation of power markets...
>
> Accordingly, at this time, we will not change our information reporting requirements. As the industry becomes more competitive, we will monitor our reporting requirements to make sure that they are needed, fair to all segments of the industry, and consistent with the workings of a competitive environment." (pages 631 and 633, FERC, 1996).

The FERC Order No. 581 also has recently reaffirmed the public reporting of discount rate information. The Natural Gas Act (15 U.S.C. 717c) requires a pipeline company to report certain information to FERC, including a shipper's name and the terms of the shipping contract. Two pipeline companies objected to this level of disclosure, arguing that it unduly compromised trade secrets. They made two requests to FERC: to cease the public disclosure of information that had been included in the discount rate reports filed by regulated gas pipeline companies and to substitute customer codes for customer names to protect the confidentiality of customer-specific information.

FERC rejected both requests. The discount rate information was found to be necessary to the agency's efforts to prevent discriminatory pricing. Supplying customer names serves a similar purpose of enabling competing shippers to determine whether they are entitled to similar treatment. Thus, the FERC concluded that the interests of the emerging competitive markets outweighed the value of keeping the terms of transactions or the identity of customers confidential.

12. Vine 1996.

13. If a product approach to disclosure is taken, power contracts must clearly state the source of power, a departure from current contracting conventions. Some contracts specify a source, others specify that power is from a system rather than from a particular source, and many are vague. Determining the fuel mix and environmental implications of the many types of contracts may be difficult and subject to some level of internally inconsistent treatment.

There are also two reasons current practices might change in ways that make the product approach easier. First, current contracting practices take place in an industry in which fuel mix and emission characteristics are less important than they will be when disclosure and full retail competition are in place. Second, to simplify future retail disclosure, wholesale sales might be required to specify the associated fuel mix and environmental characteristics at the time of sale.

14. It may be possible to construct a disclosure system that draws upon both the product and supplier approaches, securing the benefits of each. Disclosure of the fuel mix and key environmental characteristics by all suppliers can be required on a company-wide basis, including affiliates. "Renewable" for purposes of this supplier disclosure requirement might be defined relatively loosely. This can be combined with an optional part of the label for renewables and other green options.

15. A second possible disadvantage is that a product approach may undermine label credibility if suppliers that are predominantly fossil-based market a green product. Consumers might believe that power comes from all the supplier's plants, not simply a few that are nominally earmarked for particular customers. This possibility is being tested in consumer research.

16. FTC 1996.

17. A has a 250 MW inflow from X, outside the region, and a 150 MW net outflow to B, producing to an overall inflow of 100 MW.

18. EPA 1995, and personal communication with Richard Morgan, Utility Regulatory Program, Acid Rain Division, U.S. EPA.

19. EIA, October 1995.

20. EIA, December 1995.

21. See, for example, UDI, 1996.

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Contents

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The National Conference of State Legislatures serves the legislators and staffs of the nation's 50 states, its commonwealths and territories. NCSL is a bipartisan organization with three objectives:

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Foreword

The National Council and its Research Agenda

The National Council on Competition and the Electric Industry initiated its Consumer Information Disclosure Project in November 1996 to assist state regulators and legislators address consumer information needs in a competitive electricity environment. This effort followed the National Association of Regulatory Utility Commissioners' November 1996 resolution calling for enforceable, uniform standards that would allow retail consumers to easily compare price, price variability, resource mix, and the environmental characteristics of their electricity purchases.

To implement this resolution, the National Council has initiated a multi-part research agenda. The research agenda is designed to identify and provide state regulators and legislators with technical information, consumer research and policy options. The tasks currently being undertaken are described below. A report, describing the result of the research, will be prepared for each of the tasks. Copies will be made available on the National Council's website as they become available.

Task 1. ***Full Environmental Disclosure for Electricity: Tracking and Reporting Key Information.*** This report identifies mechanisms to trace transactions from generators through sellers, aggregators or marketers to retail buyers to provide consumers with full resource mix and environmental characteristics disclosure. (Available June 1, 1997)

Task 2. ***Disclosure of Fuel Mix and Emissions by Retail Electric Service Providers: Issues of Confidentiality versus the Public Right to Know.*** This report identifies the legal and policy considerations involving suppliers' requests to keep information confidential versus the public interest in having the information publicly available to consumers and others. (Available June 1, 1997)

Task 3. ***Price and Service Disclosure.*** This report presents standard options for comparing price information, risk, important contract terms and conditions, and consumer protection information.

Task 4. ***Consumer Preferences from Focus Groups.*** The report summarizes the results from consumer focus groups conducted with participants in New Hampshire and Massachusetts retail competition pilot programs. Separate focus group reports will summarize interviews with consumers in California, Washington and Colorado. (Available June 1, 1997)

Task 5. ***Baseline Tracking Survey.*** This report describes a survey instrument to gather consumer information, knowledge, attitudes and practices relevant to retail electricity purchasing practices. The report also summarizes the initial—or baseline—data on these issues.

Task 6. ***Disclosure Testing.*** This report summarizes the results of disclosure testing conducted to measure consumer acceptance, ease of use, comprehensibility and task performance.

Task 7. ***Research Synthesis.*** This final report summarizes all the disclosure-related research and makes final recommendations, including model state statutes and regulations.

The National Council's home page address is: http://www.erols.com/naruc.

Executive Summary

Customer choice will require that consumers be given reliable information from which to make energy decisions. This paper concludes that the necessary elements, to do this are the following:

- It is feasible to develop a uniform mechanism for disclosing emissions and fuel mix.

- The long-established methods of measuring generation, demand and contract rights were developed to track cash flows and associated fuel mix and emission characteristics. These same methods can easily be adapted to provide the basis for disclosure. Although many of the electric utility industry's existing institutions and market structures will change, the basic settlement processes will remain and can be used for disclosure.

- All the necessary generation, fuel use and emission information to support disclosure is already collected. With very few exceptions the information is publicly available through federal and state agencies. For a number of reasons, we suggest that existing data and definitions be used but that new market structures or institutions—such as Power Pools or Independent System Operators (ISOs)—collect and disseminate the information.

Several important tasks clearly remain for those who wish to further the cause of full disclosure:

- The National Council on Competition in the Electric Utility Industry (National Council) is taking a leadership role in developing disclosure standards and guidelines. A multi-part disclosure related research effort coordinated by the National Council is under way. The research is being aided by a Department of Energy (DOE)-convened interagency task force consisting of representatives from DOE, Federal Energy Regulatory Commission (FERC), Energy Information Administration (EIA), Environmental Protection Administration (EPA), Federal Trade Commission (FTC) and Federal Drug Administration (FDA). Results will be disseminated as work is completed.

- State commissions, particularly those that are considering retail competition, should articulate the need for full consumer disclosure to facilitate the efficient operation of a competitive market. Commissions should initiate state or regional efforts to identify options and issues and implement disclosure requirements in a timely manner. Input should be gathered from a broad cross section of stakeholders.

- Federal and state commissions should carefully assess and take into account in their decisions the extent to which the public interest in full disclosure outweighs requests for trade secret status.

- Federal and state commissions should recognize that the formative stage of new market institutions, such as power pools and ISOs, is the best time to examine how operations can efficiently improve consumer access to key information.

Full Environmental Disclosure for Electricity: Tracking and Reporting Key Information

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